Kramer Electronics, Ltd.

USER MANUAL

Model:

VP-438

Presentation Switcher / Scaler

Contents

1	**Introduction**	**1**
2	**Getting Started**	**1**
2.1	Quick Start	1
3	**Overview**	**3**
3.1	About HDMI—General Description	4
3.2	About HDCP—General Description	5
3.3	Recommendations for Best Performance	5
4	**Your VP-438 Presentation Switcher / Scaler**	**5**
5	**Installing the VP-438 in a Rack**	**9**
6	**Connecting the VP-438 Presentation Switcher / Scaler**	**10**
7	**Controlling the VP-438**	**12**
7.1	Controlling via the Front Panel Buttons	12
7.2	Using the OSD Menu	12
7.2.1	The MAIN MENU	13
7.2.2	The FINETUNE Menu	14
7.2.3	The AUDIO Menu	14
7.2.4	The OSD Menu	15
7.3	Connecting to VP-438 via RS-232	15
7.4	Controlling via the Infrared Remote Control Transmitter	16
8	**Technical Specifications**	**17**
9	**RS-232 Communication Protocol**	**19**

Figures

Figure 1: VP-438 Presentation Switcher / Scaler 6
Figure 2: Connecting the VP-438 Presentation Switcher / Scaler 11
Figure 3: Infrared Remote Control Transmitter 16

Tables

Table 1: VP-438 Presentation Switcher / Scaler Front Panel Features 7
Table 2: VP-438 Presentation Switcher / Scaler Rear Panel Features 8
Table 3: The MAIN MENU Features 13
Table 4: The FINETUNE Menu Features 14
Table 5: The AUDIO Menu Features 14
Table 6: The OSD Menu Features 15
Table 7: Infrared Remote Control Transmitter Functions 16
Table 8: Technical Specifications of the VP-438 Presentation Switcher /Scaler 17
Table 9: Input Resolutions 18
Table 10: Character Symbols Definitions 19
Table 11: RS-232 Protocol 20

1 Introduction

Welcome to Kramer Electronics! Since 1981, Kramer Electronics has been providing a world of unique, creative, and affordable solutions to the vast range of problems that confront video, audio, presentation, and broadcasting professionals on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better! Our 1,000-plus different models now appear in 11 groups[1] that are clearly defined by function.

Congratulations on purchasing your Kramer **VP-438** *Presentation Switcher / Scaler*. This product, which incorporates HDMI™ technology, is ideal for:

- Projection systems in conference rooms, boardrooms, hotels and churches
- Home theater up-scaling

The package includes the following items:

- **VP-438** *Presentation / Switcher Scaler*
- Power cord and rack "ears"
- Infrared remote control transmitter
- This user manual[2]

2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual
- Use Kramer high performance high resolution cables[3]

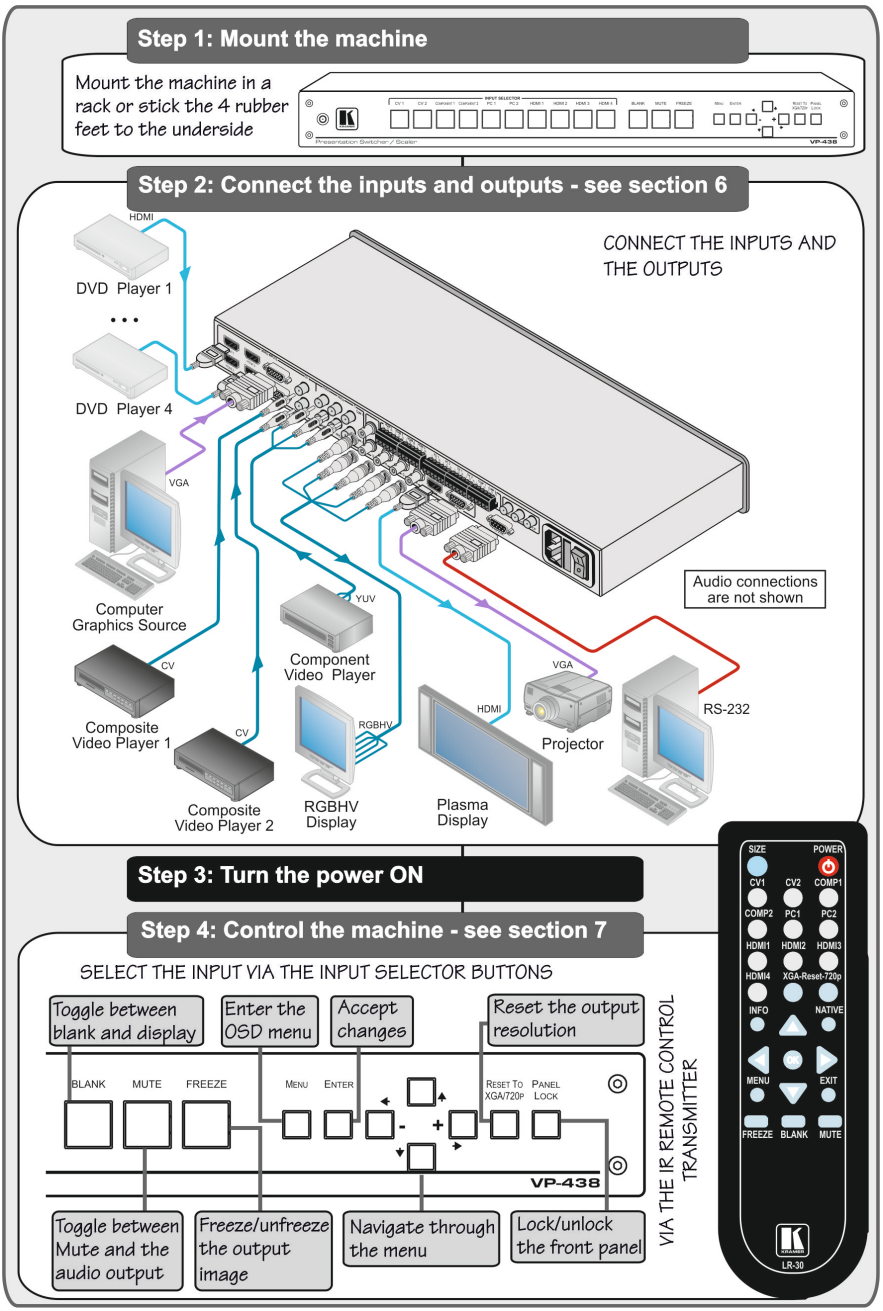
2.1 Quick Start

This Quick start chart summarizes the basic setup and operation steps.

1 GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Routers; GROUP 3: Control Systems; GROUP 4: Format/Standards Converters; GROUP 5: Range Extenders and Repeaters; GROUP 6: Specialty AV Products; GROUP 7: Scan Converters and Scalers; GROUP 8: Cables and Connectors; GROUP 9: Room Connectivity; GROUP 10: Accessories and Rack Adapters and GROUP 11: Sierra Video Products

2 Download up-to-date Kramer user manuals from the Internet at this URL: http://www.kramerelectronics.com

3 The complete list of Kramer cables is on our Web site at http://www.kramerelectronics.com


Step 1: Mount the machine
Mount the machine in a rack or stick the 4 rubber feet to the underside
Step 2: Connect the inputs and outputs - see section 6
CONNECT THE INPUTS AND THE OUTPUTS
HDMI
DVD Player 1
DVD Player 4
VGA
Computer Graphics Source
CV
Composite Video Player 1
CV
Composite Video Player 2
YUV
Component Video Player
RGBHV
RGBHV Display
HDMI
Plasma Display
VGA
Projector
RS-232
Audio connections are not shown
Step 3: Turn the power ON
Step 4: Control the machine - see section 7
SELECT THE INPUT VIA THE INPUT SELECTOR BUTTONS
Toggle between blank and display
Enter the OSD menu
Accept changes
Reset the output resolution
BLANK
MUTE
FREEZE
MENU
ENTER
RESET TO XGA/720P
PANEL LOCK
VP-438
Toggle between Mute and the audio output
Freeze/unfreeze the output image
Navigate through the menu
Lock/unlock the front panel
VIA THE IR REMOTE CONTROL TRANSMITTER
SIZE
POWER
CV1
CV2
COMP1
COMP2
PC1
PC2
HDMI1
HDMI2
HDMI3
HDMI4
XGA-Reset-720p
INFO
NATIVE
MENU
EXIT
FREEZE
BLANK
MUTE
LR-30

3 Overview

The Kramer **VP-438** is a high quality presentation switcher and scaler. It accepts one of 10 inputs: four HDMI signals, two computer graphics signals on 15-pin HD connectors, two composite video signals on RCA connectors and two component video[1] signals on RCA connectors. It scales the video, embeds the audio, and outputs the signal to the HDMI output, as well as to a computer graphics output and an RGBHV video output with digital audio and analog stereo audio outputs.

The **VP-438** *Presentation Switcher / Scaler*:

- Is HDTV compatible and the resolution can be up- or down-scaled[2]
- Is HDCP compliant, the HDCP (High Definition Content Protection) license agreement allows copy−protected data on the HDMI input to pass only to the HDMI output
- Output signal is available in three formats: 1 HDMI and 2 RGBHV (on 5 BNC connectors, and one 15−pin HD connector)
- Has analog audio inputs which include volume control, and digital (S/PDIF) and analog stereo audio outputs
- Automatically detects and selects the audio source for the HDMI input. Default selection is HDMI – if this is not present, then the machine uses the audio from the analog input
- Comes with an On-Screen Display (OSD) for easy setup and adjustment, accessible via the IR remote control and via the front-panel buttons
- Has a non-volatile memory that retains the last settings used
- Supports firmware upgrade[3] via RS-232

Control your **VP-438**:

- Directly, via the front panel push buttons
- By RS-232 serial commands transmitted by a touch screen system, PC, or other serial controller
- Remotely, from the infrared remote control transmitter

The **VP-438** is housed in a 19" 1U rack mountable enclosure, with rack "ears" included, and is fed from a 100-240V AC universal switching power supply.

1 Also known as Y, Pb, Pr, Y, Cb, Cr and YUV; compatible with both SD and HD component

2 you can find the available resolutions in Table 8

3 To check if firmware upgrades are available, go to our Web site at http://www.kramerelectronics.com

3.1 About HDMI—General Description

High-Definition Multimedia Interface (HDMI) is an uncompressed all-digital[1] audio/video interface, widely supported in the entertainment and home cinema industry. It delivers the highest high-definition image and sound quality. Note that Kramer Electronics Limited is an HDMI Adopter and an HDCP Licensee.

In particular, HDMI[2]:

- Provides a simple[3] interface between any audio/video source, such as a set-top box, DVD player, or A/V receiver and video monitor, such as a digital flat LCD / plasma television (DTV), over a single lengthy[4] cable
- Supports standard, enhanced, high-definition video, and multi-channel digital audio[5] on a single cable
- Transmits all ATSC HDTV standards and supports 8-channel digital audio, with bandwidth to spare to accommodate future enhancements and requirements
- Benefits consumers by providing superior, uncompressed digital video quality via a single cable[6], and user-friendly connector
- Is backward-compatible with DVI (Digital Visual Interface)
- Supports CEC, two-way communication between the video source (such as a DVD player) and the digital television, enabling new functionality such as automatic configuration and one-button play
- HDMI has the capacity to support existing high-definition video formats (720p, 1080i, and 1080p, 2K and 4K), standard definition formats such as NTSC or PAL, as well as 480p and 576p.

1 Ensuring an all-digital rendering of video without the losses associated with analog interfaces and their unnecessary digital-to-analog conversions

2 HDMI, the HDMI logo and High-Definition Multimedia Interface are trademarks or registered trademarks of HDMI licensing LLC

3 With video and multi-channel audio combined into a single cable, the cost, complexity, and confusion of multiple cables currently used in A/V systems is reduced

4 HDMI technology has been designed to use standard copper cable construction at up to 15m

5 HDMI supports multiple audio formats, from standard stereo to multi-channel surround-sound. HDMI has the capacity to support Dolby 5.1 audio and high-resolution audio formats

6 HDMI provides the quality and functionality of a digital interface while also supporting uncompressed video formats in a simple, cost-effective manner

3.2 About HDCP—General Description

The High-Bandwidth Digital Content Protection (HDCP) standard, developed by Intel, protects digital video and audio signals transmitted over DVI or HDMI connections between two HDCP-enabled devices to eliminate the reproduction of copyrighted material. To protect copyright holders (such as movie studios) from having their programs copied and shared, the HDCP standard provides for the secure and encrypted transmission of digital signals.

3.3 Recommendations for Best Performance

To achieve the best performance:

- Connect only good quality connection cables, thus avoiding interference, deterioration in signal quality due to poor matching, and elevated noise-levels (often associated with low quality cables)
- Do not secure the cables in tight bundles or roll the slack into tight coils
- Avoid interference from neighboring electrical appliances and position your Kramer **VP-438** away from moisture, excessive sunlight and dust

4 Your VP-438 Presentation Switcher / Scaler

Figure 1, Table 1 and Table 2 define the **VP-438** *Presentation Switcher / Scaler*:

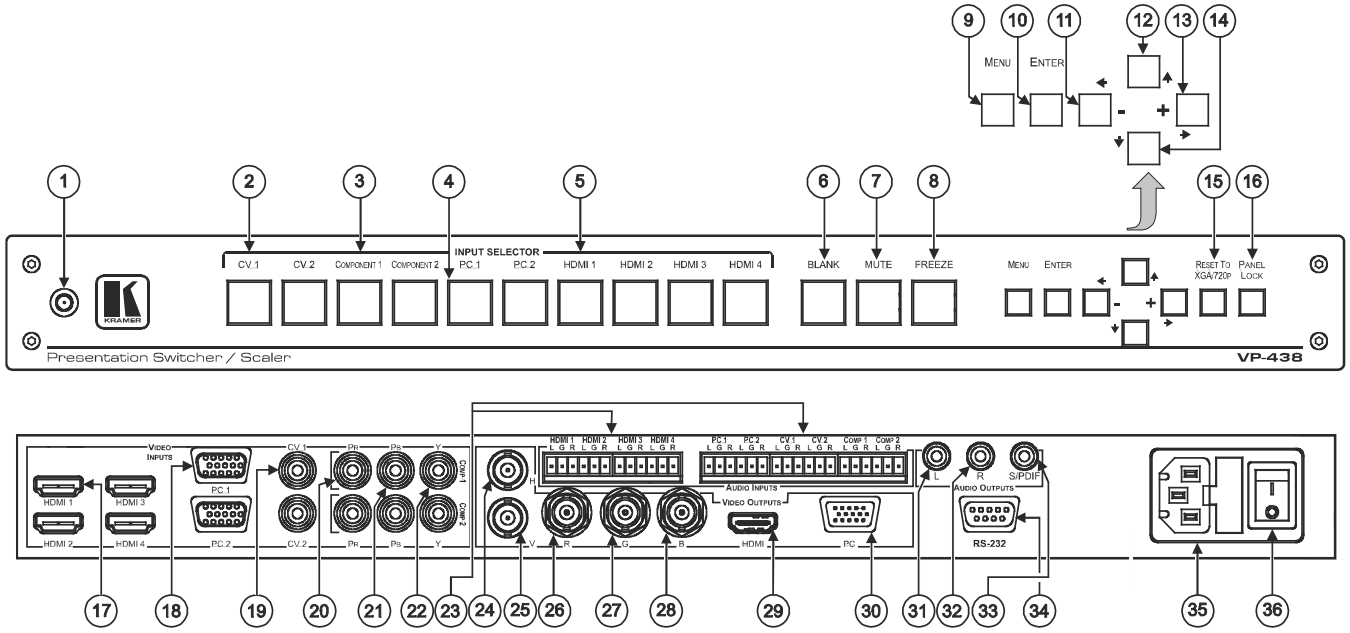


Figure 1: VP-438 Presentation Switcher / Scaler

Table 1: VP-438 Presentation Switcher / Scaler Front Panel Features

#	Feature		Function
1	*IR* Receiver		Receives signals from the remote control transmitter
2	*INPUT SELECTOR* Buttons	*CV*	Press to select the composite video input (from 1 to 2)
3		*COMPONENT*	Press to select the component video input (from 1 to 2)
4		*PC*	Press to select the computer graphics input (from 1 to 2)
5		*HDMI*	Press to select the HDMI input (from 1 to 4)
6	*BLANK* Button		Press to toggle between a blank screen and the display[1]
7	*MUTE* Button		Press to toggle between muting (blocking out the sound) and enabling the audio output
8	*FREEZE* Button		Press to freeze/unfreeze the output video image[1]
9	*MENU* Button		Displays the OSD menu (see Section 7.2)
10	*ENTER* Button		Press to accept changes and change the SETUP parameters[2]
11	- ⬅ Button		Press to decrease numerical values or select from several definitions. When not working in the OSD—press to reduce volume
12	⬆ Button		Press to move up the menu list[2]
13	+ ➡ Button		Press to increase numerical values or select from several definitions. When not working in the OSD—press to increase volume
14	⬇ Button		Press to move down the menu list[2]
15	*RESET TO XGA/720p* Button		Press and hold to reset the video resolution to XGA or 720p[3]
16	*PANEL LOCK* Button		Press and hold[4] to lock/unlock the front panel buttons

1 Can be programmed to follow MUTE (see Section 7.2.3)

2 See Section 7.2

3 Press and hold for about 2 seconds to reset to XGA; or press and hold for about 5 seconds to reset to 720p

4 For about 2 seconds

Table 2: VP-438 Presentation Switcher / Scaler Rear Panel Features

#	Feature		Function
17	*VIDEO INPUTS*	*HDMI* Connector	Connect to the HDMI source (from 1 to 4)
18		*PC* 15-pin HD Connector	Connect to the computer graphics source (from 1 to 2)
19		*CV* RCA Connector	Connect to the composite video source (from 1 to 2)
20		*PR* RCA Connector	Connect to the component video source[1] (from 1 to 2)
21		*PB* RCA Connector	
22		*Y* RCA Connector	
23	*AUDIO INPUTS* Unbalanced Stereo Terminal Block Connectors	*HDMI*	Connect to the analog audio HDMI source (from 1 to 4)
		PC	Connect to the analog audio computer graphics source (from 1 to 2)
		CV	Connect to the analog audio composite video source (from 1 to 2)
		COMP	Connect to the analog audio component video source (from 1 to 2)
24	*VIDEO OUTPUTS*	*H* BNC Connector	Connect to the RGBHV video acceptor
25		*V* BNC Connector	
26		*R* BNC Connector	
27		*G* BNC Connector	
28		*B* BNC Connector	
29		*HDMI* Connector	Connect to the HDMI acceptor
30		*PC* 15-pin HD Connector	Connect to a VGA acceptor
31	*AUDIO OUTPUTS* RCA Connectors	*L*	Connect to the left stereo analog audio acceptor
32		*R*	Connect to the right stereo analog audio acceptor
33		*S/PDIF*	Connect to a digital audio acceptor
34	*RS-232* 9-pin D-sub Port		Connect to the PC or the remote controller
35	Power Connector with Fuse		AC connector, enabling power supply to the unit
36	Power Switch		Illuminated switch for turning the unit ON or OFF

1 For component video, connect all three connectors: Y, Pr, Pb (also known as YUV)

5 Installing the VP-438 in a Rack

This section provides instructions for rack mounting the unit.

Before installing in a rack, be sure that the environment is within the recommended range:

OPERATING TEMPERATURE:	0º to +55ºC (32º to 131ºF)
STORAGE TEMPERATURE:	-45º to +72ºC (-49º to 162ºF)
HUMIDITY:	10% to 90%, RHL non-condensing

CAUTION!

When installing on a 19" rack, avoid hazards by taking care that:

1. It is located within the recommended environmental conditions, as the operating ambient temperature of a closed or multi unit rack assembly may exceed the room ambient temperature.

2. Once rack mounted, enough air will still flow around the machine.

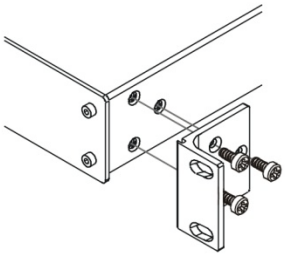
3. The machine is placed straight in the correct horizontal position.

4. You do not overload the circuit(s). When connecting the machine to the supply circuit, overloading the circuits might have a detrimental effect on overcurrent protection and supply wiring. Refer to the appropriate nameplate ratings for information. For example, for fuse replacement, see the value printed on the product label.

5. The machine is earthed (grounded) in a reliable way and is connected only to an electricity socket with grounding. Pay particular attention to situations where electricity is supplied indirectly (when the power cord is not plugged directly into the socket in the wall), for example, when using an extension cable or a power strip, and that you use only the power cord that is supplied with the machine.

To rack-mount a machine:

1. Attach both ear brackets to the machine. To do so, remove the screws from each side of the machine (3 on each side), and replace those screws through the ear brackets.



2. Place the ears of the machine against the rack rails, and insert the proper screws (not provided) through each of the four holes in the rack ears.

Note:

- In some models, the front panel may feature built-in rack ears
- Detachable rack ears can be removed for desktop use
- Always mount the machine in the rack before you attach any cables or connect the machine to the power
- If you are using a Kramer rack adapter kit (for a machine that is not 19"), see the Rack Adapters user manual for installation instructions available from our Web site

6 Connecting the VP-438 Presentation Switcher / Scaler

To connect[1] your **VP-438**, as illustrated in the example in Figure 2, do the following[2]:

1. Connect an HDMI source (for example, a DVD player) to each of the HDMI VIDEO INPUT connectors[3] (from 1 to 4).
2. Connect a computer graphics source to the PC 1 15-pin HD VIDEO INPUT connector.
3. Connect a composite video source (for example, a composite video player) to both CV VIDEO INPUT RCA connectors.
4. Connect a component video source (for example, a component video player) to the COMP 1 P_R, P_B and Y, VIDEO INPUT RCA connectors.
5. Connect the audio input signals to the AUDIO INPUT terminal block connectors, as required (not shown in Figure 2).
6. Connect the RGBHV VIDEO OUTPUT BNC connectors to an RGBHV acceptor (for example, an RGBHV display).
7. Connect the HDMI VIDEO OUTPUT connector to an HDMI acceptor (for example, a plasma display).
8. Connect the VGA VIDEO OUTPUT 15-pin HD connector to a VGA acceptor (for example, a projector).
9. Connect the audio output signals to the AUDIO OUTPUTS stereo analog audio acceptor and/or the digital audio acceptor, as required (not shown in Figure 2).
10. Connect the power cord[4] (not shown in Figure 2).

1 You do not have to connect all the inputs and outputs, connect only those that are required

2 Switch OFF the power on each device before connecting it to your VP-438. After connecting your VP-438, switch on its power and then switch on the power on each device

3 Alternatively, you can connect the DVI connector on the DVD player to the HDMI connector on the VP-438 via a DVI-HDMI adapter. When using this adapter, you can connect the audio signal via the terminal block connector

4 We recommend that you use only the power cord that is supplied with this machine

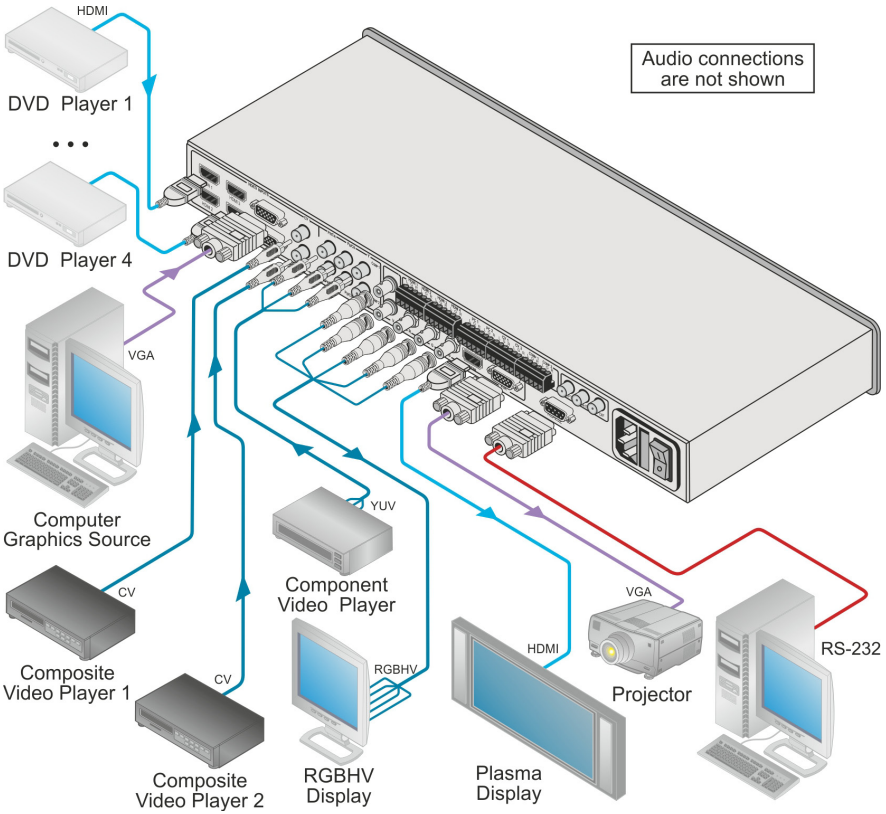


Figure 2: Connecting the VP-438 Presentation Switcher / Scaler

7 Controlling the VP-438

The **VP-438** can be controlled via:

- The front panel buttons (see Section 7.1)
- The OSD menu (see Section 7.2)
- RS-232 serial commands transmitted by a touch screen system, PC, or other serial controller (see Section 7.3)
- The infrared remote control transmitter (see Section 7.4)

7.1 Controlling via the Front Panel Buttons

The **VP-438** includes the following front panel buttons:

- Input selector buttons for selecting the required input: CV (1 and 2), COMPONENT (1 and 2), PC (1 and 2) or HDMI (1 to 4)
- BLANK, MUTE and FREEZE buttons
- MENU, ENTER, and arrow[1] buttons
- RESET TO XGA/720p and PANEL LOCK buttons[2]

7.2 Using the OSD Menu

The control buttons let you control the **VP-438** via the OSD menu.

Press the:

- MENU button to enter the menu[3]
- ENTER button to accept changes and to change the menu settings
- Arrow[1] buttons to move through the OSD menu, which is displayed on the video output

On the OSD menu, select EXIT to exit the menu.

1 Up, down, left and right

2 As defined in Table 1

3 The default timeout is set to 10 seconds

7.2.1 The MAIN MENU

Table 3 defines the MAIN MENU features and functions.

Table 3: The MAIN MENU Features

Mode	Function			
CONTRAST	Set the contrast[1]			
BRIGHTNESS	Set the brightness[1]			
FINETUNE	(see Section 7.2.2)			
COLOR	Set the red, green and blue shades			
SIZE[2]	Select the size of the display: FULL, OVERSCAN, UNDER1, UNDER2, LETTER BOX, PANSCAN (default, FULL)			
SOURCE	Select the source: (default VGA)			
	Appears as:	Source input	Appears as:	Source input
	CV1	CV 1	PC2	VGA 2
	CV2	CV 2	HDMI1	HDMI 1
	YPBPR1	COMP 1	HDMI2	HDMI 2
	YPBPR2	COMP 2	HDMI3	HDMI 3
	PC1	VGA 1	HDMI4	HDMI 4
OUTPUT	Select the output resolution from the menu (default NATIVE):			
	Appears as:	Output resolution:	Appears as:	Output resolution:
	1080I60	1080i @60Hz	WXGA	1366x768
	1080P60	1080p @60Hz	NATIVE[3]	
	576I	576i	VGA	640x480
	576P	576p	SVGA	800x600
	720P50	720p @50Hz	XGA	1024x768
	1080I50	1080i @50Hz	SXGA	1280x1024
	1080P50	1080p @50Hz	UXGA	1600x1200
	1280x800	1280x800	480I	480i
	WSXGA	1680x1050	480P	480p
	WUXGA	1920x1200	720P60	720p @50Hz
	WXGA+	1440x900	1600x900	1600x900
	SXGA+	1400x1050		
AUDIO	See Section 7.2.3			
OSD	Set the OSD parameters: H POSITION, V POSITION, TIMER, BACKGROUND and DISPLAY (see Section 7.2.4)			
FACTORY RESET	Resets to the default parameters (resolution is set to XGA or 720p[4])			
INFORMATION	Displays the source, the input resolution, the output resolution and the software version			
AUTO SYNC OFF	Turn the auto sync ON/OFF. When ON, a short period after not detecting a valid video signal on the selected input, the unit will disable the H and V syncs on the analog outputs until a valid input is again detected or any keypad button is pressed			
EXIT	Select to exit the menu			

1 The range and default values vary according to the input signal

2 UNDER1 refers to an underscan of 6% and UNDER2 refers to an underscan of 9%

3 Select "NATIVE" to select the output resolution from the EDID of the connected HDMI monitor

4 If you cannot see the display after factory reset, use the front panel Res. button to set the correct resolution: press continuously for 2 seconds to reset to XGA, or continuously for 5 seconds to reset to 720p

7.2.2 The FINETUNE Menu

Table 4 defines the FINETUNE menu:

Table 4: The FINETUNE Menu Features

Input Signal	Parameter	Function
CV, COMPONENT	HUE	Set the color hue
	SATURATION	Set the color saturation
	SHARPNESS	Set the sharpness of the picture
	NOISE REDUCTION	Select the noise reduction: OFF, HI, LOW and MID (middle)
	COLOR FILTER	Set to ON to enable color filtering[1]
VGA	PHASE	Set the clock phase
	CLOCK	Set the clock frequency
	H-POSITION	Set the horizontal position of the picture
	V-POSITION	Set the vertical position of the picture
	AUTO TUNE[2]	When set to ON, auto adjusts the image[3] every time the input is switched to VGA or when the input resolution changes
	COLOR FILTER	Set to ON to enable color filtering[1]
HDMI	COLOR FILTER	Set to ON to enable color filtering[1]

7.2.3 The AUDIO Menu

Table 5 defines the AUDIO menu.

Table 5: The AUDIO Menu Features

Parameter	Function
OUTPUT VOLUME	Set the output volume (from 0 to 100) [4]
INPUT VOLUME	Set the input volume (from 0 to 100) [4]
DELAY	Select the audio delay time: OFF, 40ms, 110ms and 150ms
SOUND	Select the sound options: ON, MUTE
MUTE FOLLOWS	Select the action that will be followed by mute: INDEPENDENT[5], FREEZE, BLANK, FREEZE/BLANK[6]
HDMI AUDIO IN[7]	Select AUTOMATIC[8], EMBEDDED[9] or ANALOG[10]

1 May improve the output image for certain graphic cards where color fringing is seen

2 Alternatively, you can auto adjust the image by pressing the ENTER button when not within the OSD menu

3 Centers the picture correctly on the screen

4 Not applicable for embedded HDMI audio inputs

5 INDEPENDENT means that the audio muting is independent of the FREEZE and BLANK functions

6 FREEZE/BLANK means that when you FREEZE or BLANK the video, then the audio will be muted (the MUTE function follows the FREEZE and the BLANK functions)

7 Enabled only when one of the HDMI inputs is selected

8 In this case, the embedded audio on the HDMI input is selected for an HDMI signal, or the analog audio input is selected if the input is not HDMI (for example, for a DVI input signal)

9 In this case, the embedded audio in the HDMI signal is selected

10 In this case, the analog audio input is selected

7.2.4 The OSD Menu

Table 6 defines the OSD menu.

Table 6: The OSD Menu Features

Parameter	Function
H POSITION	Set the horizontal position of the OSD (from 0 to 100)
V POSITION	Set the vertical position of the OSD (from 0 to 100)
TIMER	Set the timeout period in seconds (from 5 to 100)
BACKGROUND	Set the OSD background between 0 (solid black) and 8 (transparent)
DISPLAY	Select[1] between INFO, ON, OFF

7.3 Connecting to VP-438 via RS-232

You can connect to the **VP-438** via an RS-232 connection using, for example, a PC. Note that a null-modem adapter/connection is not required.

To connect to the **VP-438** via RS-232, connect the RS-232 9-pin D-sub rear panel port on the **VP-438** unit via a 9-wire straight cable (only pin 2 to pin 2, pin 3 to pin 3, and pin 5 to pin 5 need to be connected) to the RS-232 9-pin D-sub port on your PC.

1 Select the information shown on the screen during operation. The information is shown permanently when set to ON; it is not shown when set to OFF, and it is shown for a few seconds when set to INFO

7.4 Controlling via the Infrared Remote Control Transmitter

You can control the **VP-438** from the infrared remote control transmitter, as Figure 3 and Table 7 define:

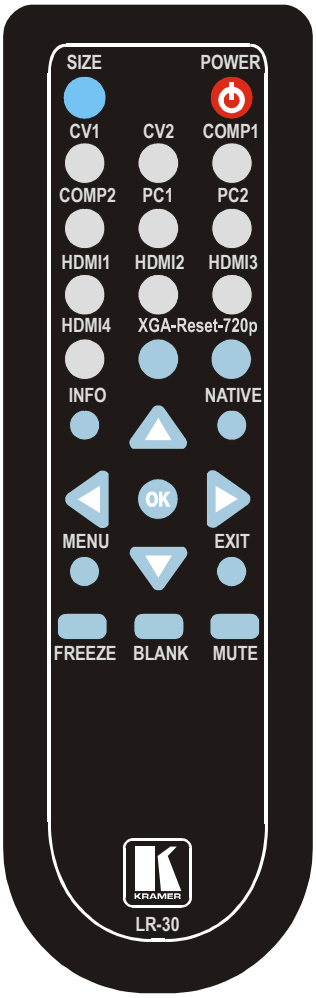


Figure 3: Infrared Remote Control Transmitter

Table 7: Infrared Remote Control Transmitter Functions

Keys	Function
SIZE	Set the size of the image displayed
POWER	Turn the **VP-438** ON or OFF[1]
CV1	Select the composite video 1 input
CV2	Select the composite video 2 input
COMP1	Select the component video 1 input
COMP2	Select the component video 2 input
PC1	Select the UXGA 1 input
PC2	Select the UXGA 2 input
HDMI1	Select the HDMI 1 input
HDMI2	Select the HDMI 2 input
HDMI3	Select the HDMI 3 input
HDMI4	Select the HDMI 4 input
XGA Reset	Reset the resolution to XGA
720p Reset	Reset the resolution to 720p
INFO	Displays the selected input, the input and output resolutions and the firmware versions[2] on the OSD
NATIVE	Select the output resolution via the EDID of the connected HDMI monitor
	Four navigation keys (Left and right arrow keys also function as output volume control)
OK	Press to accept changes
MENU	Enter the OSD menu
EXIT	EXIT the menu
FREEZE	Freeze/unfreeze the output video image
BLANK	Toggle between a blank screen and the display
MUTE	Toggle between muting (blocking out the sound) and enabling the audio output

1 OFF in this case means that the unit is in standby mode

2 To check if firmware upgrades are available, go to our Web site at http://www.kramerelectronics.com

8 Technical Specifications

Table 8: Technical Specifications[1] of the VP-438 Presentation Switcher /Scaler

INPUTS:	4 HDMI connectors (HDMI, HDCP version 1.1) 2 VGA on a 15-pin HD connector 2 composite video on an RCA connector 2 component video each on 3 RCA connectors Unbalanced stereo audio on 10 3-pin terminal block connectors
OUTPUT:	1 RGBHV on 5 BNC connectors 1 HDMI connector (HDMI, HDCP version 1.1) 1 VGA on a 15-pin HD connector 1 S/PDIF on an RCA connector 1 analog stereo audio on 2 RCA connectors
H FREQUENCY:	15.63-90kHz
V FREQUENCY:	50-100Hz
RGB SYNCS:	H and V TTL separated syncs
RGB LEVEL:	1.2Vpp max, 75Ω load
XGA OUT LEVEL:	1.2Vpp max, 75Ω load
S/PDIF OUT LEVEL:	0.55Vpp constant
OUTPUT RESOLUTIONS:	720p60, 1080i60, 1080p60, 576i, 576p, 720p50, 1080i50, 1080p50, 1280x800, WXGA, WSXGA, WXGA+, WUXGA, NATIVE, VGA, SVGA, XGA, SXGA, SXGA+, UXGA, 480i, 480p, 1600x900
CONTROLS:	CV 1, CV 2, component 1, component 2, PC 1, PC 2, HDMI 1, HDMI 2, HDMI 3, HDMI 4, input selector buttons; blank, mute, freeze buttons; menu, enter, menu arrows, reset to XGA/720p, lock buttons, RS-232, IR
POWER SOURCE:	100-240V AC, 25VA max.
DIMENSIONS:	19" x 7" x 1U (W, D, H) rack mountable
WEIGHT:	2.7kg (6lbs) approx
ACCESSORIES:	Power cord, rack ears, IR remote control

1 Specifications are subject to change without notice

Table 9: Input Resolutions[1]

Resolution/Refresh Rate	CV	Component	VGA	HDMI
480I/576I(NTSC/PAL)	Yes (480i30x2 / 576i25x2)	Yes	No	No
480P/576P	No	Yes	No	Yes[2]
720P @(60/50)	No	Yes	Yes[3]	′es[2]
1080I @(60/50)	No	Yes	No	Yes[2]
1080P @(60/50)	No	Yes	Yes[3]	Yes[2]
1080P @(24/25/30)	No	Yes	No	Yes[2]
VGA @(60/72/75/85)	No	No	Yes	Yes
SVGA @(56/60/72/75/85)	No	No	Yes	Yes
XGA @(60/70/75/85)	No	No	Yes	Yes
SXGA @(60/75/85)	No	No	Yes	Yes
UXGA @60	No	No	Yes	Yes
WXGA@60(1280x800)	No	No	Yes	Yes
WXGA+@60(1440x900)	No	No	Yes	Yes
WXGA@60(1366x768)	No	No	Yes	Yes
SXGA+@60(1400x1050)	No	No	Yes	Yes
WSXGA@60(1680x1050)	No	No	Yes	Yes
WUXGA@60(1920x1200)	No	No	Yes	Yes

1 Go to our Web site at http://www.kramerelectronics.com to check for updated resolution lists

2 Supports both RGB and YUV colorspace for all HD resolutions

3 Supports only RGB colorspace for 720p and 1080p input resolutions

9 RS-232 Communication Protocol

The following is the COM port setting:

Baud Rate: 9600bps
Parity: None
Data Bits: 8bits
Stop Bits: 1bit
Set CTS Mode: Off
Set XON/XOFF: Off

Table 10 defines the symbol characters:

Table 10: Character Symbols Definitions

Symbol	Meaning
■	Space
[CR]	Carriage Return, ASCII code 0x0D
[LF]	Line Feed, ASCII code 0x0A

Set Command

Type in: Y■Control_Type■Function■Param[CR][1]

Reply: Z■Control_Type■Function■Param[CR][LF]

Get Command:

Type in: Y■Control_Type■Function[CR]

Reply: Z■Control_Type■Function■Param[CR][LF]

Example:

Example 1: set Brightness value to 32

Send: Y■1■16■32[CR]

Reply: Z■1■16■32[CR][LF]

Example 2: get current output resolution (2 = SVGA)

Send: Y■4■21[CR]

Reply: Z■4■21■2[CR][LF]

1 When sending a command, a blank character may precede [CR] if desired

Table 11: RS-232 Protocol

Control Type	Function	Param (for Set)	Function Description	Comment
0	0	N/A	SIZE button on remote control	
0	1	N/A	POWER button on remote control	
0	2	N/A	FREEZE button on remote control	
0	3	N/A	480p button on remote control	
0	4	N/A	576p button on remote control	
0	5	N/A	720p button on remote control	
0	6	N/A	1080i button on remote control	
0	7	N/A	1080p button on remote control	
0	8	N/A	VGA button on remote control	
0	9	N/A	SVGA button on remote control	
0	10	N/A	XGA button on remote control	
0	11	N/A	SXGA button on remote control	
0	12	N/A	WXGA button on remote control	
0	13	N/A	UXGA button on remote control	
0	14	N/A	INFO button on remote control	
0	15	N/A	UP button on remote control	
0	16	N/A	NATIVE button on remote control	
0	17	N/A	LEFT button on remote control	
0	18	N/A	OK button on remote control	
0	19	N/A	RIGHT button on remote control	
0	20	N/A	MENU button on remote control	
0	21	N/A	DOWN button on remote control	
0	22	N/A	EXIT button on remote control	
0	23	N/A	CV1 button on remote control	
0	25	N/A	COMP1 button on remote control	
0	26	N/A	HDMI1 button on remote control	
0	27	N/A	HDMI2 button on remote control	
0	28	N/A	COMP2 button on remote control	
0	29	N/A	PC 1 button on remote control	
0	30	N/A	BLANK button on remote control	
0	31	N/A	MUTE button on remote control	
	33	N/A	Auto adjust	FW V6.12
0	34	N/A	CV2 button on remote control	
0	35	N/A	PC2 button on remote control	
0	36	N/A	HDMI3 button on remote control	
0	37	N/A	HDMI4 button on remote control	
1: Set 2: Get	4	0~100	Color: Red	
1: Set 2: Get	5	0~100	Color: Green	
1: Set 2: Get	6	0~100	Color: Blue	

Control Type	Function	Param (for Set)	Function Description	Comment
1: Set 2: Get	16	0~100	Brightness	
1: Set 2: Get	17	0~100	Contrast	
1: Set 2: Get	25	0~100	Hue	
1: Set 2: Get	26	0~100	Sharpness	
1: Set 2: Get	29	0~100	Saturation	
1: Set 2: Get	33	0~100	set an absolute volume for Output	
1: Set 2: Get	34	0~100	set an absolute volume for Input	
1: Set 2: Get	41	0~100	OSD Setting :H-Position	
1: Set 2: Get	42	0~100	OSD Setting: V-Position	
1: Set 2: Get	43	0~100	OSD Timeout	
1: Set 2: Get	44	0~8	OSD Background	
1: Set 2: Get	50	0~3	NR (Noise Reduction)	0: Off 1: Low 2: Mid 3: High
1: Set 2: Get	51	0~3	Audio delay	0: Off 1: 40ms 2: 110ms 3: 150ms
1: Set 2: Get	52	0~2	HDMI AUDIO IN	0 : AUTOMATIC 1 : EMBEDDED 2 : ANALOG
1: Set 2: Get	84	0~1	Auto Sync Off	0 : OFF (FW:6.14) 1 : ON
3: Set 4: Get	0	1~10	Select Input Source	1: CV1 2: CV2 3: COMP1 4: COMP2 5: PC1 6:PC2 7: HDMI1 8: HDMI2 9: HDMI3 10: HDMI4
3: Set 4: Get	1	0~5	Size	0: Full 1: Panscan 2: Overscan 3: Underscan1 4: Letterbox 5: Underscan2

Control Type	Function	Param (for Set)	Function Description	Comment
3: Set 4: Get	21	0~22	Output Resolution	0: Native 1: VGA 2: SVGA 3: XGA 4: SXGA 5: UXGA 6: 480i 7: 480p 8: 720p60 9: 1080i60 10: 1080p60 11: 576i 12: 576p 13: 720p50 14: 1080i50 15: 1080p50 16: WXGA 17: WSXGA 18: WUXGA 19: 1280x800 20: WXGA+ (1440X900) 21: SXGA+ (1400X1050) 22: 1600x900
3: Set	23	1	Factory Reset	
6: Set 7: Get	0	0~2	Power	0: Power Down 1: Power On 2: Reboot
6: Set 7: Get	1	0~1	Freeze	0: Off 1: On
6: Set 7: Get	2	0~1	Blank	0: Off 1: On
6: Set 7: Get	3	0~1	Mute	0: Off 1: On
6: Set 7: Get	4	0~1	Key lock	0: Off 1: On
6 : Set 7 : Get	140	0~1	Auto Tune (under fine tune)	0 : Clear Auto Tune 1 : Set Auto Tune

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Safety Warning:
Disconnect the unit from the power supply before opening/servicing.

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